

must be mentioned that in a paper just to hand, H. W. Schmidt (*Phys. Zeit.*, 1909, p. 6) gives the new value 4100 for these rays, making the usual assumption, apparently, that they were homogeneous. I obtained the value as high as 6500 for a small proportion of the rays, but no definite extreme upper limit can be assigned, and it is probable that some exist with a value even higher. Some of the β rays of radium possess, so far as I have yet been able to see, values for H_p above 9000, and probably the extreme upper limit is not reached at 11,000. The extreme value found in Kaufmann's celebrated experiments was 4500, but it must be remembered that he worked with the less sensitive—although more precise—photographic method. For H_p to have values so high as those recorded the velocity of the rays must be but a small fraction of 1 per cent. below that of light, and their mass must be at least four times in the case of uranium and six times in the case of radium the normal value found at lower speeds. I have had in mind the possibility that the effect might be due to a secondary radiation, and particularly in view of Bragg's theory of the nature of the γ rays, to a secondary radiation from the air; but I have not been able to prove that the rays are other than primary β rays. The direction of their deviation was specifically tested.

FREDERICK SODDY.

Physical Chemistry Laboratory, University of Glasgow.

P.S., January 26.—I have omitted to mention that Paschen (*Ann. Phys.*, 1904, xiv., 389) obtained evidence of the existence of β rays from radium with a value for H_p so high as 8000.

F. S.

The Origin of the Aborigines of Tasmania.

In kindly reviewing my little book on the Discovery and Settlement of Port Mackay, Queensland, in NATURE of September 24, 1908, the reviewer, "J. W. G.," states that Mr. Ling Roth "objects to calling the blackfellows aborigines, as he holds that Australia was first occupied by a negroid people who have been supplanted by the present race. This view, well known from its adoption by [the late] Sir William Flower, appears to be now generally discredited, owing to the lack of evidence in its support."

Since the above was written I have received from Sir William Turner his recently published memoir on the "Craniology, Racial Affinities, and Descent of the Aborigines of Tasmania" (*Trans. Roy. Soc. Edin.*). In this monograph Sir William Turner comes to the same conclusion as I have regarding the origin of the Tasmanians, arriving there by a totally different and probably more scientific method than that which I have been able to follow. He says (p. 394):—"Though, as has already been stated, a woolly-haired race is not now represented in Australia, the tendency of the South Australians to show Tasmanian characters in the cranial vault is worthy of consideration, in this particular, as an indication of the probable route of migration and of racial affinity. . . . The evidence seems to be in favour of the descent of the Tasmanians from a primitive Negrito stock, which migrated across Australia, rather than by the route of the Melanesian Oceanic islands lying to the north and east of the Australian continent." Linguistic evidence appears also to favour the view. In the December (1908) number of *Man* (p. 185) Father Schmidt ("Classification of Australian Languages") tells us that "the languages of S.E. Australia agree with Tasmanian in one of the most important points—the position of the affixless genitive."

I therefore venture to think that the more the question is studied the more does it seem probable that the real aborigines of Australia were the forefathers of the unhappy people we have known as Tasmanians.

H. LING ROTH.

Halifax, Yorks, December 28, 1908.

MR. LING ROTH's letter involves two questions. The term "native" in Australia means white people born in Australia; the blackfellows are known as aborigines. It seems to me, therefore, only inviting misunderstanding

and mistakes to reject the accepted Australian use of the word aborigines in a book dealing with Australia.

The second question is the possible descent of the extinct Tasmanians from the race that occupied Australia before the European colonisation. The very important memoir by Sir William Turner on the craniology of the Tasmanians (*Trans. Roy. Soc. Edin.*, vol. xlvi., pp. 365–403, three plates) was not published at the date of the review; but though he admits the probable passage of the Tasmanians across Australia, he adds to the difficulty of connecting the Tasmanians with the present Australian aborigines.

On pp. 387–8 of his memoir he gives a long list of important characters in which the Australian skulls differ from those of the Tasmanians, and he concludes this catalogue of differences as follows:—"From the consideration of these characters the skulls support the opinion, based on the study by so many observers of the external features, that the existing aborigines of Australia are distinct from the Tasmanians, although the presence, in a proportion of the natives of South and West Australia, of skulls in which the height was less than the breadth, the not unfrequent sunk sagittal suture, the more marked parietal eminences, and the antero-posterior parietal depressions, point to a possible amount of intermixture and racial affinity of these Australian tribes with the Tasmanians." (The italics are mine.)

That "a proportion" of the aborigines of South Australia should have skulls approximating to those of the Tasmanians is easily explained. Tasmanians were taken to South Australia by the sealers, and gave rise to half-castes. The occasional Victorian aborigines with woolly hair and other Tasmanian features had probably the same origin.

Sir William Turner's memoir may be taken as the final dismissal of Sir William Flower's view that the Tasmanians were Melanesian, and the weight of authority, including Huxley and Mr. Ling Roth, that they were Negrito is now overwhelming; but this adds to the difficulty of alliance between the Tasmanians and the Australians. Sir William Turner says (p. 389), "the term Negrito should be limited to . . . black-skinned, woolly-haired people with small brachycephalic heads, jaws not very projecting, nose not so flattened, nostrils not so wide as in the Negro, and of dwarf-like stature." These characters are not those of the Australian aborigines, with their long, straight hair; hyperdolichocephalic heads, projecting jaws, extraordinarily wide nostrils, and tall stature.

The absence of evidence of the Tasmanian race in the well-searched drifts and gravels of Australia renders their passage across Australia improbable. I am, of course, glad to find that Sir William Turner adds his authority to the view of the Negrito affinity of the Tasmanians, but it does not follow that they crossed the mainland of Australia, a view that has been abandoned by some of those who formerly adopted it.

It would be strange if the Australian and Tasmanian languages had not some points of affinity, but the differences have been usually regarded as fundamental. Mr. Ling Roth has recognised Andamanese affinities in the language of the Tasmanians, which is, of course, consistent with Sir William Turner's conclusions, but it does not help to ally the Tasmanians and Australians.

J. W. G.

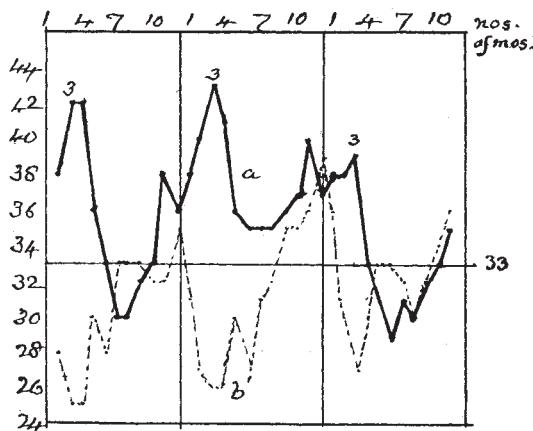
Warm Months in Relation to Sun-spot Numbers.

THE following method, applied to Greenwich data, seems to yield support to the view that sun-spots mean, on the whole, warmth in this region.

Taking your sun-spot numbers (from 1841), pick out the 22 highest (group A) and the 22 lowest (group B)—22 is about a third of the series. Next, confining attention to the year after each year of group A, note how many warm Januaries, Februaries, and so on, there were in the 22 years. This gives the series (a) below. Do the same in the case of group B, getting the series (b). Smooth each of these series with sums of 3, getting (a') and (b'). On comparing (a') with (b') the former is found to be throughout in excess of the latter, as shown.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
(a)	11	14	15	14	12	10	13	12	10	14	13	13=151
(b)	11	8	8	10	8	12	7	12	13	10	12	14=125
(a')	40	43	41	36	35	35	35	36	37	40		
(b')	27	26	26	30	27	31	32	35	35	35	36	
(a')-(b')												+13+17+15+6+8+4+3+1+2+4

The series (a') and (b') are expressed in curve-form in the middle section of the diagram. Note that the (a') curve culminates in the third month (i.e. with the 3-month group February-April), and just then the other curve is at its lowest point. The difference here is 43-26=17 (about 65 per cent. of the lower value).



Curves of total warm months in 3-month groups.

We might extend these curves on either side, considering in one case the temperatures in those years of highest and lowest sun-spot numbers, and in the other those in the second years after.

In both extensions we find, again, the extreme contrast at the third month, but in both, the curves cross each other in part; and in the third section there is general "break-down," with year-difference small. Thus we have, for totals of warm months:—

Diff.

Years of (22) highest and (22) lowest sun-spot numbers	...	...	...	...	...	...	...	142-123=19
1st year after	...	...	...	...	...	...	...	151-125=26
2nd	,,	,,	,,	,,	,,	,,	,,	134-130=4

The sharp contrast above referred to in the early part of the year (February-April) seems to me remarkable, and may be usefully considered in relation to the flowering of plants and other phenological phenomena, the variations in which, from year to year, seem to be connected with the sun-spot cycle (as I have before tried to show).

ALEX. B. MACDOWALL.

RECENT EARTHQUAKES.

THE Italian earthquake still keeps a prominent place in the daily newspapers, and earthquakes still continue in the stricken country, but this is no more than must be expected. Every great earthquake is followed by numerous after-shocks, more frequent at first and gradually becoming fewer and fewer; 949 shocks were registered at Monteleone in 1783, and 159 in 1784. A similar experience is being repeated in Calabria at the present time; reports of more earthquakes at Reggio and Messina are common in the papers, but the record is too incomplete to be worth repeating in detail. Among these after-shocks some have been of sufficient violence to bring down shattered or weakened walls and buildings, and some were of a severity which would have caused serious

damage and destruction to buildings had they stood by themselves. The first of these destructive after-shocks seems to have occurred at 7.24 p.m. on January 23, which brought down a good many houses left standing by the earthquake of December 28 at Reggio, and was described as of equal violence. This statement must be accepted with reserve, for experience has shown that after a very great earthquake and during the period when after-shocks are frequent, all sense of proportion is lost, earthquake-fear is developed, and every shock of more than average severity ranks out of proportion to its real importance. Though the shock was apparently a considerable one, and may well have compared in violence with its predecessor at Reggio, yet the much smaller area over which it had the power of inflicting damage, as also the much smaller size of the area over which it was felt, mark it as an altogether minor shock.

Besides the local after-shocks, earthquakes have been reported in the daily papers from other parts of the world, and not unnaturally a connection has been assumed which has probably no foundation in fact. The most important of these were the North American earthquake of January 11, and that in Asia Minor on January 19; the former of these was felt at Victoria, B.C., at 3.55 p.m., local time, and was described as severe; it was also felt at Vancouver and Nanaimo, in British Columbia, and in the Washington State, where some slight damage was done at Port Townsend. The earthquake in Asia Minor seems to have been more severe if not more extensive; it took place at 6.40 a.m. on January 19, and is said to have destroyed 679 houses at Phocaea, two persons are reported to have been killed at Menemen, and the same number at Cassaba. Neither of these was, however, of any importance, and would probably have passed without notice but for the attention directed to earthquakes at the present moment.

Much the same may be said of the shock which shook northern Italy on January 13, though possibly this may have been of the nature of a sympathetic after-shock, that is to say, brought about by a change in the distribution of strains in the earth's crust, consequent on the movements which have taken place in Calabria. It belonged to that little understood class of shocks which affect a large area without anywhere reaching destructive violence, and nowhere did more than trivial damage, though felt at Triest, Trent, Milan, Genoa, Siena, and in all the country between.

In spite of these earthquakes, there is no indication of any real increase in seismic activity; on the other hand, it is a somewhat remarkable fact that the Calabrian earthquake was a solitary one. World-shaking earthquakes almost invariably occur in groups, and are seldom unaccompanied by one or more companions, originating in distant parts of the globe, but within a few hours, or at most a few days, of each other; so frequent is this phenomenon that it has almost been elevated into a law, and an ingenious explanation, with experimental illustration, has been published. In the present instance, the records of Prof. Milne's instruments at Shide show that no other world-shaking shock accompanied the Calabrian one, and none was reported until the morning of January 23, when an earthquake, which probably originated somewhere in western Central Asia, was registered by seismographs in Europe, India, and at the Cape of Good Hope; probably we shall hear more of this earthquake, for its origin was in a region which is not devoid of villages and towns, but the interval which had elapsed prevents our regarding the two earthquakes as companions. This isolation of the Calabrian earthquake may find its explanation in the fact that although a great, it was not a very